

IN THE CLAIMS:

Claim 1 (original): A valve assembly comprising a housing (2) in which a first flow passage (7), a valve chamber (9) of a shut-off valve (8) and a second flow passage (10, 23) are provided in the mentioned order,

a diaphragm (13) hermetically covering the valve chamber (9),
the first flow passage (7) having one end opened into an inner surface of the valve chamber (9) to which a mid portion of the diaphragm (13) is opposed, and
a valve seat (15) formed around an opening at one end of the first flow passage (7),
the shut-off valve (8) being opened and closed by allowing the diaphragm (13) to approach and separate from this valve seat (15), wherein
a groove portion (18) is formed in the inner surface of the valve chamber (9) at a periphery of the valve seat (15) and is provided with an groove outlet/inlet (19) which is opened in an area larger than a circle having a diameter of a groove width (w), and
the second flow passage (10, 23) communicates with the valve chamber (9) through the groove outlet/inlet (19) and the groove portion (18) in the mentioned order.

Claim 2 (original): The valve assembly as set forth in claim 1, wherein at least part of the groove outlet/inlet (19) is opened into a groove side surface (20).

Claim 3 (currently amended): The valve assembly as set forth in claim 1 [[or 2]], wherein at least a portion of the groove outlet/inlet (19) side of the second flow passage (10, 23) is inclined with respect to an axis (22) of the first flow passage (7).

Claim 4 (currently amended): The valve assembly as set forth in ~~any one of claims 1 to 3~~ claim 1, wherein the groove portion (18) has a groove bottom surface (21) which increases its depth toward the groove outlet/inlet (19).

Claim 5 (currently amended): The valve assembly as set forth in ~~any one of claims 1 to 4~~ claim 1, wherein the second flow passage (10, 23) communicates with the groove portion (18) from a tangent direction.

Claim 6 (currently amended): The valve assembly as set forth in ~~any one of claims 1 to 5~~ claim 1, wherein the largest depth (h) of the groove portion (18) is of a dimension not less than 30% of the groove width (w)[[.]].

Claim 7 (currently amended): The valve assembly as set forth in ~~any one of claims 1 to 6~~ claim 1, wherein the largest depth (h) of the groove portion (18) is of a dimension at least equal to the minimum diameter (d) of the first flow passage (7).

Claim 8 (new): The valve assembly as set forth in claim 2, wherein at least a portion of the groove outlet/inlet (19) side of the second flow passage (10, 23) is inclined with respect to an axis (22) of the first flow passage (7).